

Jiang Nan

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EDUCATION

University of California, San Diego

09/2012-07/2016

- Bachelor of Science in *Electrical Engineering*
- Overall GPA: 3.656/4.0; Major GPA: 3.757/4.0
- Invited to Honor Society

RESEARCH EXPERIENCE

Research Assistant, Video Processing Lab, UCSD

04/2016-Present

Supervisor: Prof. Truong Nguyen

- Studied Image/Video Processing and used tools C++/Python/OpenCV;
- Researched on *Hand Pose Detection based on Convolutional Neural Network*
- Researched on *Hand Segmentation with Multiple Background and Various Hand Gestures*;

Research Assistant, Institute of Automation, Chinese Academy of Sciences

08/2016-09/2016

- Served as the team leader in the project of *License Plate Number Recognition*;
- Located the car plate based on color segmentation and k-nearest neighbor algorithm;
- Corrected the angle of the car plate and cut out edge noises; conducted character segmentation with statistic methods;
- Implemented character recognition using template matching and SVM (referred to libsvm: A Library for Support Vector Machines by Chih-Chung Chang).

SELECTED PROJECTS

Hand Pose Detection based on Convolutional Neural Network

03/2016-Present

- Constructed a synthetic dataset for training;
- Built a hand model grasping objects mathematically and assigned each joint certain degrees of freedom;
- Trained the Convolutional Neural Network with multiple layers and each layer with feature parameters (i.e. deep learning).

Hand Segmentation with Multiple Background and Various Hand Gestures

06/2016-Present

- Used depth map as algorithm's input, and used both RGB and depth images to extract ground truth to compare performance;
- Adopted C++ and OpenCV to segment hands from different backgrounds and when hands are doing different tasks;
- Extracted training/testing dataset of 6 subjects and 10 objects for each subject;
- Segmented hand information from different color space; filtered out noises and enhanced useful hand information with OpenCV and C++.

Spiking Neural Network with TrueNorth Chip

Expected

- Understand the architecture of the spiking-neuron integrated circuit;
- Follow IBM demo and copy their Lab result to get used to it;
- Design an algorithm that satisfies the constraints and make use of the TrueNorth chip.

Transimpedance Amplifier Design

12/2015

Overview: Given the architecture of the circuit, design the size of all MOSFETS and resistors to meet the requirements of small signal gain, bandwidth range, common-mode output range and power consumption minimization.

- Divided the given circuit into two parts: the bias circuitry independent of power supply voltage as well as process and temperature variations and the actual common-source amplifier circuitry;
- Drew a small signal model for the amplifier circuitry without any capacitors, and derived the transfer function for amplifier circuitry and the -3dB bandwidth using ZTVC;
- Calculated width/length of each MOSFET and resistance of resistors to satisfy above requirements;
- Used OrCAD for simulation and evaluation.

Registered 4-operand and 8-bit unsigned Adder

06/2016

Overview: The design consisted of Carry-Lookahead adders and was optimized for fast performance without making significant trade-off with power consumption or layout area.

- Wrote a system Verilog code and tested the syntax and logic of codes with ModelSim;
- Used Design Compiler to generalize a synthesized netlist and design constraints;
- Used Innovus Cadence to place and route the layout from logic gates.

Pattern Recognizing Image Processing

02/2016

Sponsor: Ivana Mikic (Image Informatics LLC)

Overview: Designed and implemented an algorithm that could find periods, orientation and location of repeating elements (Applied to Medical Imaging Informatics).

- Created a perfect grid by using Auto-correlation and detected straight line with Hough Transform;
- Fitted a quadratic to displacement vectors and distorted the perfect grid with estimated vectors;
- Used binning & regression to apply algorithm locally.

Gradient-Descent GPS Algorithm

12/2015

- Located the object with 4 measurements of pseudo-range between the object and the satellites;
- Applied Gauss-Newton Algorithm and Steepest Gradient Descent Algorithm with MATLAB and converge error to zero;
- Compared the clock error, estimation error and loss function between Gauss-Newton Algorithm and Steepest Gradient Descent Algorithm.

PROFESSIONAL SKILLS

Electronic Circuits & Systems: OrCad PSpice; Cadence tools; Signal Processing; Simulink; ModelSim; Quartus; Innovus; Design Compiler; Circuit Test in Laboratory (Oscilloscope, function generator, frequency counter and etc); Circuit Debugging; SPECTRE; System Architecture; Embedded System; Semiconductor

Signal and Image Processing: Matlab; Python/Jupyter Notebook; C++(Xcode); OpenCV; OpenGL; Artificial Intelligence; GPS; Least-Square Algorithm; Image Analysis; Neural Network